

**Abstract of the Invention**

A system for regulating nitrided gate oxide layer formation is provided. The system includes one or more light sources, each light source directing light to one or more nitrided gate oxide layers being deposited and/or formed on a wafer. Light  
5 reflected from the nitrided gate oxide layers is collected by a measuring system, which processes the collected light. The collected light is indicative of the nitrogen concentration of the respective nitrided gate oxide layers on the wafer. The measuring system provides nitrogen concentration related data to a processor that determines the nitrogen concentration of the respective nitrided gate oxide layers on the wafer. The  
10 system also includes one or more nitrided gate oxide layer formers where a nitride gate oxide former corresponds to a respective portion of the wafer and provides for nitrided gate oxide layer formation thereon. The processor selectively controls the nitrided gate oxide layer formers to regulate nitrided gate oxide layer formation on the respective nitrided gate oxide layer formations on the wafer, and particularly to control, *in situ*, the  
15 amount of nitrogen incorporated into the gate oxide layer.